

B-Type Natriuretic Peptide and Multimarker Approaches in Cardiovascular Medicine

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The combination of the obesity pandemic, the aging of the population, and improvements in acute cardiovascular care is the driving force behind the secondary epidemic of cardiovascular disease (CVD) in the United States. This epidemic is marked by an increasing pool of patients with chronic CVD as well as many other overlapping conditions, including pulmonary conditions, chronic kidney disease, and diabetes.

The era of proteomics, the rapid discovery and practical use of measurable gene-coded proteins to evaluate, manage, and intervene in disease, is upon us. Clinicians have demonstrated their ability to quickly learn about new and useful blood tests and put them to practical use. Most readers can probably remember the day when aspartate transaminase (AST) and lactate dehydrogenase (LDH) subforms were used to diagnose acute myocardial infarction.

A rapidly evolving science of biomarker development and testing allows today's clinicians to use many powerful tools, including cardiac troponins and other markers of myocyte injury, in combination with markers of cardiovascular function including the natriuretic peptides. This supplement focuses on the use of cardiac markers in understanding pathophysiology, diagnosis, prognosis, and practical management. Markers of acute injury that are released and measurable only in a disease state (eg, cardiac troponins) are essential for the diagnosis of acute myocardial infarction and are valuable both in acute and

chronic prognosis of patients with CVD. Measurement of multiple markers of acute injury is preferable to a single marker because the multi-marker panel can enhance decision statistics and bring speed to the acute triaging process. It should be stressed that because each marker produces a different piece of information about the patient, much like each component of the physical examination, the most complete multi-marker approach is desired. Approved markers now include creatine kinase (CK), creatine kinase myocardial band (CK-MB), myoglobin, troponin I, troponin T, and ischemia-modified albumin. B-type natriuretic peptide (BNP) and N-terminal proBNP have recently been shown to add independent prognostic value beyond the assessment abilities of troponins. There is clearly an overlap between cardiac ischemia and its downstream sequelae of heart failure.

Heart failure is the most clearly

identified CVD state declared as epidemic in the first world. Diagnostic criteria for heart failure have not been standardized as they have been for myocardial infarction. In addition, approximately half of all heart failure patients have preserved systolic function, making the ejection fraction helpful in diagnosis and prognosis in only half of patients. However, cardiac neurohormones, produced by the myocardium in the normal state and released in rapid response to cardiac stress, are ideal biomarkers for clinical use. The approved cardiac natriuretic peptides, BNP and N-terminal proBNP, have had very rapid acceptance in the practicing community as diagnostic, prognostic, and management aids for patients with both diastolic and systolic heart failure. Of the two, BNP has been used in the preponderance of the published literature and should be considered the gold standard in heart failure patients. BNP appears to be a highly useful test, with both acute and

chronic measurement applications. Recent data indicate that, similar to their use in acute ischemic syndromes, a multi-biomarker approach with cardiac troponin I and BNP is useful in heart failure.

How can clinicians grapple with this growing list of CVD blood tests—especially in patients with overlapping ischemia and heart failure? One answer may be provision of multiple tests on a single panel, with published strategies for panel interpretation. Such a panel (Triage Cardio Profiler™, Biosite Incorporated, San Diego, CA) is now available in a rapid, point-of-care platform, to give clinicians and patients an immediate proteomic “window” into cardiac injury, acute hemodynamic stress, and long-term prognosis. Future research will fine-tune our approach to using proteomics in cardiovascular medicine. It is clear that proteomics, and someday genomics, will play a large and complex role in the diagnosis and care of patients with CVD. ■